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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Application Number	10/648,005
Filing Date	August 26, 2003
First Named Inventor	Livet et al.
Art Unit	2681
Examiner Name	Erika A. Gary
Attorney Docket Number	I-2-0384.1US

Total Number of Pages in This Submission

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☐ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Response to Missing Parts/ Incomplete Application
  - ☐ Response to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
- ☐ After Allowance communication to Technology Center (TC)
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☒ Other Enclosure(s) (please Identify below):

Communication Re Favorable IPER, Copy of International Preliminary Examination Report and Copy of approved claims as published.

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	C. Frederick Koenig III Volpe and Koenig, P.C.	Reg. No. 29,662
Signature		
Date	6/28/04	

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below.

Typed or printed name	C. Frederick Koenig III		
Signature		Date	6/28/04

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the **PATENT APPLICATION** of:	
	Livet et al.
Application No.:	10/648,005
Confirmation No.:	3306
Filed:	August 26, 2003
For:	WIRELESS RADIO RESOURCE MANAGEMENT SYSTEM USING A FINITE STATE MACHINE
Group:	2681
Examiner:	Erika A. Gary

Our File: I-2-0384.1US

Date: June 28, 2004

COMMUNICATION RE FAVORABLE IPER BY IPEA/US IN CORRESPONDING INTERNATIONAL APPLICATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This communication is to advise the Examiner of the favorable International Preliminary Examination Report (IPER) issued by the United States Patent and Trademark Office acting as International Preliminary Examination Authority in a corresponding international application. A copy of the IPER is enclosed.

The original PCT claims correspond to the claims in this U.S. application. A copy of the approved claims as published is also enclosed.

In view of the fact that PCT claims 1-20 have all been found to meet the international standards of patentability, prompt examination and allowance are respectfully requested.

Respectfully submitted,

Livet et al.

By_____
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CFK/rw
Enclosures (2)

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
ANTHONY S. VOLPE
VOLPE AND KEONIG, P.C.
UNITED PLAZA, 30 SOUTH 17TH STREET
PHILADELPHIA, PA 19103

PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of Mailing *(day/month/year)*	25 MAY 2004
Applicant's or agent's file reference 1-2-0384.1WO	**IMPORTANT NOTIFICATION**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US03/25093	12 August 2003 (12.08.2003)	28 August 2002 (28.08.2002)

Applicant

INTERDIGITAL TECHNOLOGY CORPORATION

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/US	Authorized officer
Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450	Sheila B. Smith Eugenia Zogas
Facsimile No. (703) 305-3230	Telephone No. (703)305-0100

Form PCT/IPEA/416 (July 1992)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US03/25093

I. Basis of the report

1. With regard to the elements of the international application:*

☒ the international application as originally filed.

☒ the description:
pages 1-21 as originally filed
pages none, filed with the demand
pages NONE, filed with the letter of _____.

☒ the claims:
pages 22-27, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

☒ the drawings:
pages 1-3, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

☐ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination(under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

☒ the description, pages none

☒ the claims, Nos. none

☒ the drawings, sheets/~~fig~~ none

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

** Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

*** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US03/25093

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims 1-20	YES
	Claims NONE	NO
Inventive Step (IS)	Claims 1-20	YES
	Claims NONE	NO
Industrial Applicability (IA)	Claims 1-20	YES
	Claims NONE	NO

2. CITATIONS AND EXPLANATIONS

Claims 1-20 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest a radio resource management component for the wireless telecommunication system that provides wireless communication service in predetermined geographic area to wireless transmit receive unit within such areas.

---------- NEW CITATIONS ----------

NONE

CLAIMS

What is claimed is:

1. A Radio Resource Management (RRM) component for a wireless telecommunication system that provides wireless communication service in predetermined geographic areas to Wireless Transmit Receive Units (WTRUs) within such areas, the RMM component comprising:

a plurality of finite state machines (FSMs) for controlling radio resources for a specified geographic area serviced by the telecommunication system;

each FSM configured with a plurality of states where in a selected set of functions are implemented based on state based parameters; and

each FSM configured with a plurality of state switches for toggling the FSM from one state to a different state in response to changes in the wireless communication load between the telecommunication system and WTRUs within the specified geographic area

2. The invention of claim 1 wherein the wireless telecommunication system is a 3GPP system which services geographic areas designated as cells and the RMM component is configured to implement selected functions within a Radio Network Controller (RNC) with respect to a designated cell for which the RNC manages radio resources.

3. The invention of claim 2 wherein the RMM component is configured to implement selected Control-Radio Network Controller (C-RNC) functions within the RNC and the RMM includes a FSM for implementing Real Time (RT) communication functions and a FSM for implementing Non Real Time (NRT) communication functions.

4. The invention of claim 2 wherein the RMM component is configured to implement selected Control-Radio Network Controller (C-RNC) functions within the RNC and the RMM includes a FSM for implementing UpLink (UL) communication functions and a FSM for implementing Down Link (DL) communication functions.

5. The invention of claim 2 wherein the RMM component is configured to implement selected Control-Radio Network Controller (C-RNC) functions within the RNC and the RMM includes a FSM for implementing Real Time (RT) UpLink (UL) communication functions, a FSM for implementing Real Time (RT) Down Link (DL)) communication functions, a FSM for implementing Non Real Time (NRT) UpLink (UL) communication functions, and a FSM for implementing Non Real Time (NRT) Down Link (DL) communication functions.

6. The invention of claim 5 wherein the RMM component is configured to implement selected C-RNC functions for Time Division Duplex (TDD) communications having a predetermined Time Slot format and wherein the FSM state switches are configured to toggle the respective FSM from one state to a different state in response to changes in the wireless communication load within Time Slots.

7. The invention of claim 6 wherein each FSM is configured with a normal state, a high state and an overload state and each state is associated with two switches, each to toggle to one of the other two states.

8. The invention of claim 7 in which a first time slot load threshold TST1 is selected wherein:

each state switch operable to toggle a FSM from the normal state to the high state is configured to operate when the load in at least one time slot exceeds the first threshold TST1, and

each state switch operable to toggle a FSM from the normal state or the high state to the overload state is configured to operate when the load in at least a predetermined percentage X of timeslots allocated in the cell exceed the first threshold TST1.

9. The invention of claim 8 wherein each state switch operable to toggle a FSM to return to one state from a different state is configured to operate based on a threshold that includes a hysterisis factor that is complementary to a threshold upon which the respective state switch is configured to operate the FSM to switch from the one state to the different state.

10. The invention of claim 9 in which a second time slot load threshold TST2 is selected based on the first threshold TST1 minus a hysterisis factor wherein:

each state switch operable to toggle a FSM to return to the normal state from the high state or the overload state is configured to operate when the load in all time slots falls below the second threshold TST2, and

each state switch operable to toggle a FSM to return to the high state from the overload state is configured to operate when the load in at least 100-X percentage of timeslots allocated in the cell fall below the second threshold TST2.

11. The invention of claim 1 wherein each FSM is configured with a normal state, a high state and an overload state and each state is associated with two switches, each to toggle to one of the other two states.

12. The invention of claim 11 wherein each state switch operable to toggle a FSM to return to one state from a different state is configured to operate based on a threshold that includes a hysterisis factor that is complementary to a threshold

upon which the respective state switch is configured to operate the FSM to switch from the one state to the different state.

13. A method of Radio Resource Management (RRM) for a wireless telecommunication system that provides wireless communication service in predetermined geographic areas to Wireless Transmit Receive Units (WTRUs) within such areas comprising:

providing a plurality of finite state machines (FSMs), each FSM configured with a plurality of states where in a selected set of functions are implemented based on state based parameters; and

controlling radio resources for a specified geographic area serviced by the telecommunication system by toggling the FSMs from one state to a different state in response to changes in the wireless communication load between the telecommunication system and WTRUs within the specified geographic area

14. The method of claim 13 wherein the wireless telecommunication system is a 3GPP system which services geographic areas designated as cells and the provided FSMs are configured to implement selected functions within a Radio Network Controller (RNC) with respect to a designated cell for which the RNC manages radio resources.

15. The method of claim 14 wherein the providing FSMs includes providing a FSM for implementing Real Time (RT) UpLink (UL) communication functions, a FSM for implementing Real Time (RT) Down Link (DL)) communication functions, a FSM for implementing Non Real Time (NRT) UpLink (UL) communication functions, and a FSM for implementing Non Real Time (NRT) Down Link (DL) communication functions to implement selected Control-Radio Network Controller (C-RNC) functions within the RNC.

16. The method of claim 15 wherein the FSMs are configured to implement selected C-RNC functions for Time Division Duplex (TDD) communications having a predetermined Time Slot format and wherein the toggling the respective FSMs from one state to a different state is in response to changes in the wireless communication load within Time Slots.

17. The method of claim 16 wherein each FSM is configured with a normal state, a high state and an overload state and each state is associated with two switches, each to toggle to one of the other two states and each state switch operable to toggle a FSM to return to one state from a different state operates based on a threshold that includes a hysterisis factor that is complementary to a threshold upon which the respective state switch operates the FSM to switch from the one state to the different state.

18. The method of claim 17 further comprising selecting a first time slot load threshold TST1 and a second time slot load threshold TST2 based on the first threshold TST1 minus a hysterisis factor such that:

each state switch operable to toggle a FSM from the normal state to the high state operates when the load in at least one time slot exceeds the first threshold TST1,

each state switch operable to toggle a FSM from the normal state or the high state to the overload state operates when the load in at least a predetermined percentage X of timeslots allocated in the cell exceed the first threshold TST1,

each state switch operable to toggle a FSM to return to the normal state from the high state or the overload state operates when the load in all time slots falls below the second threshold TST2, and

each state switch operable to toggle a FSM to return to the high state from the overload state operates when the load in at least 100-X percentage of timeslots allocated in the cell fall below the second threshold TST2.

19. The method of claim 13 wherein each FSM is configured with a normal state, a high state and an overload state and each state is associated with two switches, each to toggle to one of the other two states and each state switch operable to toggle a FSM to return to one state from a different state operates based on a threshold that includes a hysterisis factor that is complementary to a threshold upon which the respective state switch operates the FSM to switch from the one state to the different state.

20. The method of claim 13 wherein the providing FSMs includes providing a FSM for implementing Real Time (RT) UpLink (UL) communication functions, a FSM for implementing Real Time (RT) Down Link (DL)) communication functions, a FSM for implementing Non Real Time (NRT) UpLink (UL) communication functions, and a FSM for implementing Non Real Time (NRT) Down Link (DL) communication functions.